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WELDING
INDUSTRIAL ENGINEERING
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Appendix C

USER'S GUIDE TO THE NORM PACKAGES

CONTENTS :

A. INTRODUCTION

The objective of the Autokon system may shortly be said to be to enable the user to describe in large detail the entire steel structure of a ship or other structure in the database, and extract a variety of design and production data.

Steel information system

It should in other words be a "drawing generator" (including information for NC-cutting) but also produce material lists, weight calculations etc. To- fulfill "these tasks the present system of routines called norms play an important.role.

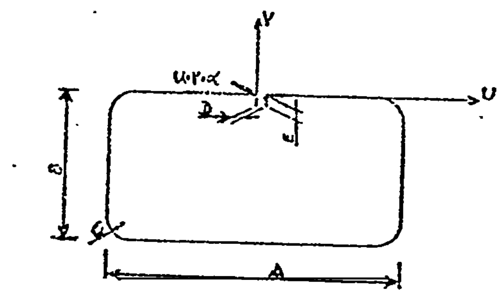
The basis of the present system of norms rests with ALKON, a problem oriented comput"er language. It is necessary to know some of the basic properties.of this language in order to understand the norm system:

It maintains a dialog with the Autokon database.
It has very extensive features for describing plane geometry.
It is general in nature and may be used to store various types of information on the database.
Various data structures may be defined by the user.
An ALKON manuscript may be stored temporarily (REP) or permanently (NORM) on the database

A description of the use of the language itself is given in the ALKON Users Guide.

The last mentioned property is the key feature which enables advanced commands to be built up in the AIXON language, commands called NORMS,

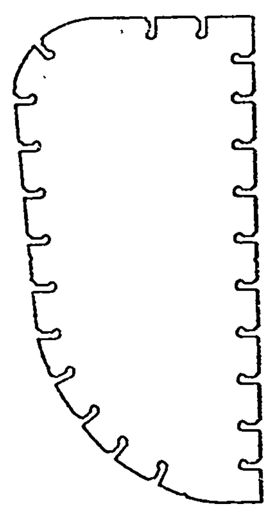
An example of a simple norm is a hole of a certain shape, but with variable parameters (hence the word norm) .



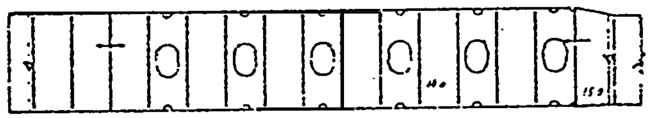
CALLING SEQUENCE

HOLE 101·(u+v+α +A+B+C+D+E)

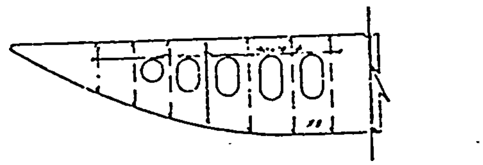
Examples of more complex norms are those building up a complete numerical description of all cutouts for longitudinals through a bulkhead:



And those defining, floors and girders in the double bottom:



MIDTBÆRER.



BUNNST. # 59.

Presently the library contains between 600 and 700 norms, most of them written according to 'a philosophy. This..Useres Guide will try to explain the philosophy and also give some practical examles in the use of the system. It also gives some basic information which the user needs in order to understand the tool" he is using.

B. PRESENTATION 0f THE PACKAGES.

B.1. THE FUNDAMENTAL IDEA OF THE PACKAGES.

Total definition of structure

As mentioned in the introduction, the main objective of Autokon is to build a full description of the scantlings of a steel structure and to utilize this as an information system giving drawings, material lists, weight estimations etc. In this picture, the norms deal with the internal structure (excluding the shell and the Iongitudinals on the shell).

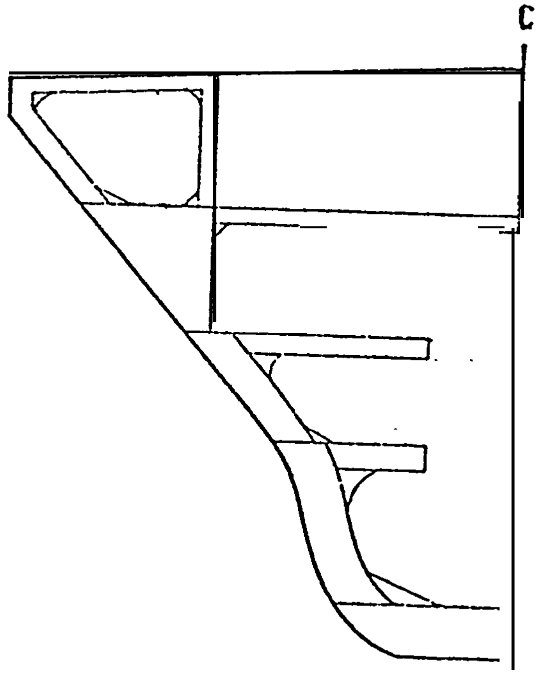
. .

Break down into smaller units

This is quite a big task and to fulfill it required a large number of norms. Thus, to obtain complete knowledge ‘of the system required a lot of time and practical use. It was therefore considered essential to break the system down into smaller more easily understood units. These units represent logical tasks to be performed, and very often thev are also related to some specific location in the structure. ‘The total objective of the norm system may thus be achieved using the packages as building blocks .

Logical tasks

An example of such a building block “is the package dealing with web-frames in the engine room.. The final result after going through . a number of steps is drawings of web-frames.



B.2. THE USE OF EACH NORM PACKAGE.

Each pakage boils down to being a description of how a number of norms are used in sequence to obtain a result within the specified frame-work. The number of norms used in each specific case may vary for the same package. A further description Cf each pakage is given in B.4. and in the Users Guide of each particular package.

Generality

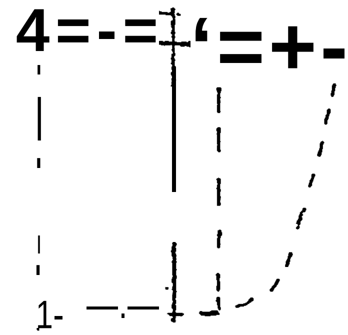
An important point regards the generality of the system. Two methods have been used to take care of this.

Levels of norms

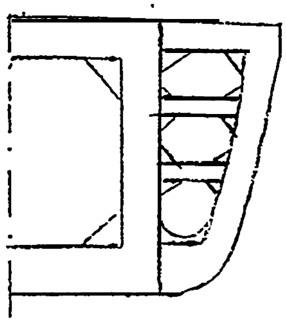
1. Some of the packages deal wit-n the steel structure at different levels, the higher level norms being more specialized. These tend to depend more on constraints imposed by the actual geometry of the structure. One example is found in the package of web-frames in tank area.

Norms in the tank area.

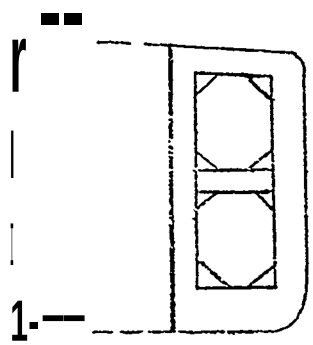
GEN PAR 351



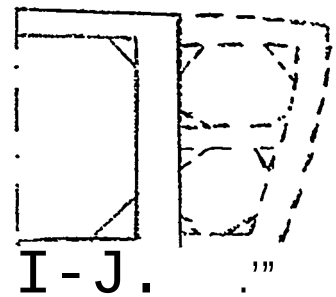
GEN PAR 352



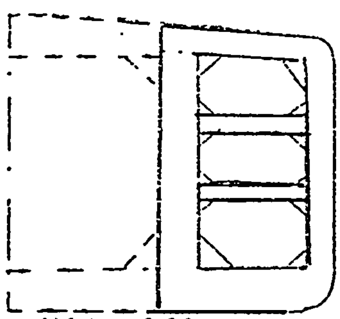
WEB 360



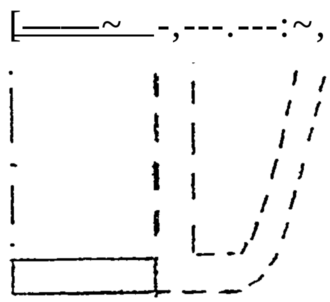
WEB 370



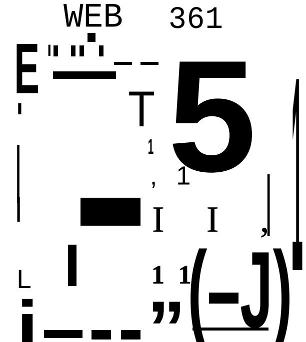
WEB 361



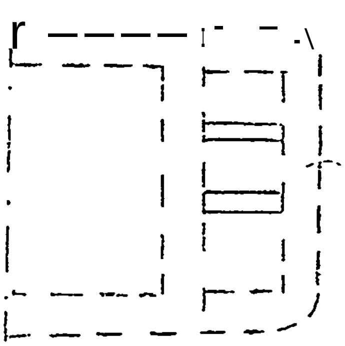
WEB 362



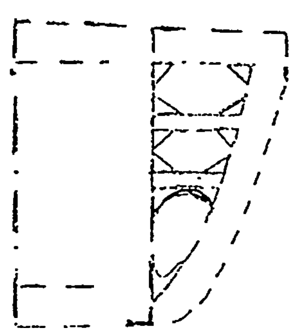
WEB 351



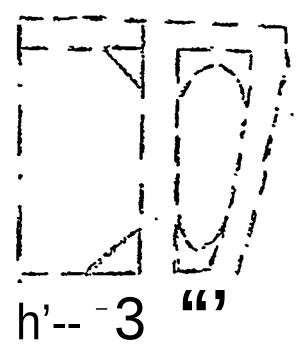
WEB 352



WEB 353



BKT 355

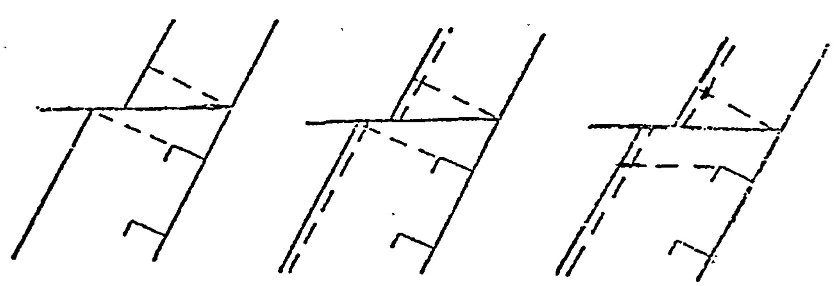


BKT 360

Modification of packages

The point is that in this case WEB 360 uses a number of other norms as subroutines. At the lower levels the norms are increasingly general. If your construction differs from possible variations within a package, the higher level norms may be modified or rewritten, still using the lower level norms.

2. The other solution is represented by the package of local stiffening. In this a rough picture is built up initially. this is then modified until the desired result is obtained.



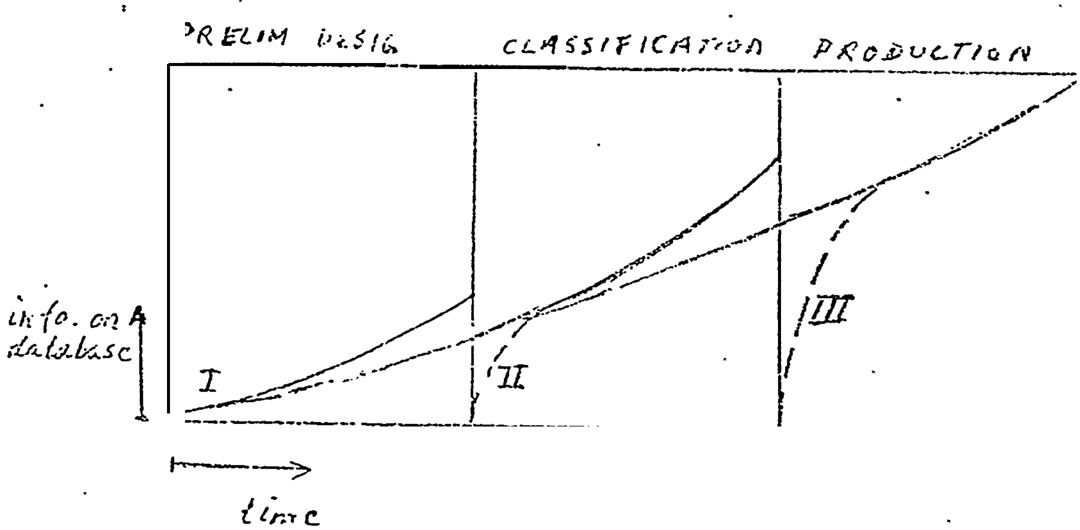
Examples of how you may design your own packages are given in chapter E.

B.3. INTEGRATED USE OF THE PACKAGES.

B.3.1. VARIOUS APPROACHES.

One of the main difficulties for a user is to get a general. view of the system. As mentioned the packages play the role of building blocks sometimes cemented together by sysyteml norms.

Before proceeding to describe the various steps, the user should realize that the system may be used in various ways:



The fig. illustrates three different utilizations:

1. The system is used from early design, the database being gradually updated and fed new data.

FILIP prelim. bodyplan

The early steps may be done using a preliminary body plan (may be generated by the program FILIP), The system will produce early layout drawings for further evaluation of strength, layout and construction problems. Drawings will not contain detailed information.

11 The procedure is started in classifiation, preferably using the fina"l bodyplan.

The" procedure is roughly the same, but the amount of details like local stiffening is

of drawings to be manually furnished with text, measurements, identifications etc.

Key data like points and angles may be extracted for production **planning.**

Class.drawimgs
prod.information
material lists

Material (stiffener) lists may be extracted depending **on** the amount of detail which has been put in.

111 The actual design of a ship is in some cases done by others, and classification drawings simply supplied as part of the deal . In this case data which is normally input to the production phase may be generated quickly at the start of this phase.

Quick generation
of data usually
available from
Classification

Note that the amount of work involved is significantly less than that of going through the entire classification procedure. This is mostly due to the fact that part of the work at earlier, stages is. concerned with output.

B..3.3. 'THE STEPS . .

In the description of each step, **some** comments will be given regarding the main approaches out... Iined in B.3. 3.1. . ,

a. The initial. input consists of a set of faired building frames and preferably also stem, stern and deck contouxs (The latter may be generated by norms if they are not available) .

Building frames

The input to Autokon database is performed by the program TRABO. (Further description of contours are given in ALKON Users Guide). Take care to obtain the correct location of origin.

TRABO

b. This step involves establishing some main parametric tables.

-ROUT 1 always runs immediately after TRABO. If TRABO is run again so is ROUT 1. The norm establishes condenced frame table in record class (3+7+1023+7+1023+3)

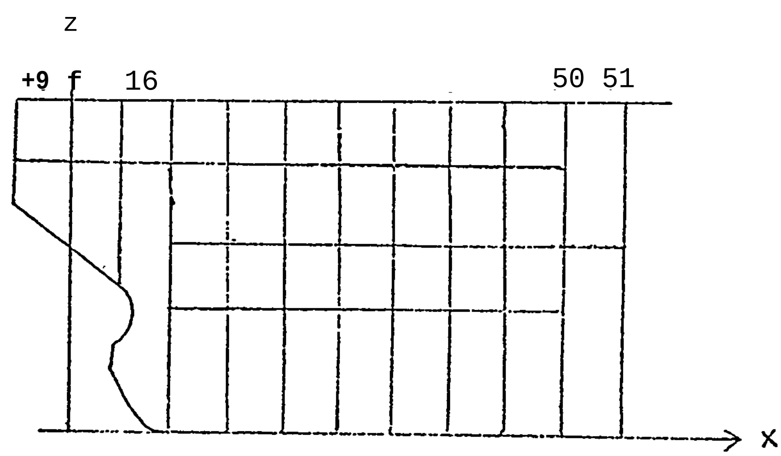
Main ship parameters

-Height of stringers, platforms and in some cases decks are defined by norms in GROUP 10. This information is later used by the norms STRINCERHT, PLTHT and DKHT.

c* Definition of the main stiffening.
(Note that double.bottoms are taken care Of by two nearly selfsufficient packages) .

Dimensions of transverse frames

- Properties of the transverse frames are described in the x - z projection.



This regards both Webframes and ordinary profiles.

The description is stored in the Midem. format (see C.4] and includes the dimensions of each frame (these may vary between different decks etc.) and wether the thickness of a frame is aft or forward of the reference line etc.

The norm used is GENMIDEM 1 of GROUP 1

profile dimension
Line 2 in Tabel 36
in record(1,4,2,0,0,0)
made by ROUT 415.

```
&
NEW ABUF' PERM ABUF'
DECK(1)
GEN MIDEM 1(+ABUF+13
+13          +31   +13     +4440     +UD0      -1   +360002
+13          +34   +0      -UD0      +UD0      -1   +360002
+13          +37   +0      -15540    +15540    -1   +360002
+16          +37   +13     +15540    +UD0      -1   -20
)
FIN CONMID(+8+13+ABUF)
&
13=web     frame no. sym.  V start.  V end.   below  plate
16=bulkh.                                     deck   thickness
```

! if standard profile

This information is later used for generation of the actual web--frames (Gl%3L!}? 3[, 4) and also for weight and center of gravity calculations if the frame consists of a standard section (profile) like HP or flatbar etc.

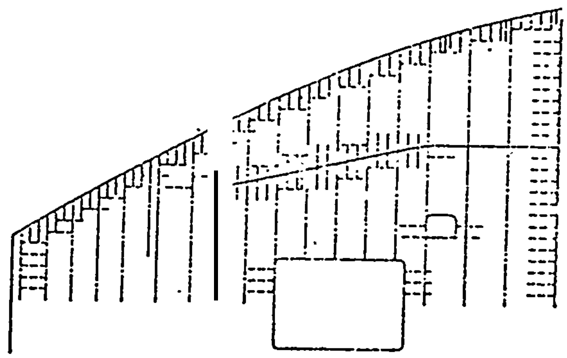
Deck stiffening

-The stiffening in the deck-planes should be described next. (GROUP 1). Again the MIDEM table (MInor DEtail Matrix) is used for the description in the database, though a variety of norms are used according to task. The full description is given in the package for "Generation of deck planes" (GROUP 1)

Information used for web-frame drawings and for augmenting contours

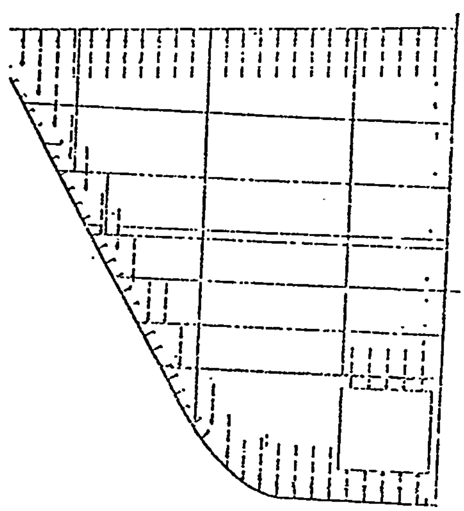
As for transverse web-frames in X-Z projection the information is later used for the generation of the actual web-frames,and the longitudinals are used for augmenting contours in the transverse plane.

An example of possible drawing output is shown in the fig.:



The package is general in that nearly all types of stiffened panels may be arrived at.

-Stiffening on transverse bulkhead (GROUP1.2) ,Similar to deck planes.



d. Definition of main structures.

Ccmcerns web-frames and stringers.

-Web-frames:

Threee main Configurations each with many variations

Three main types are supplied. which are "typical for engine room, tank area and forepeak. Each yard number should, however, be inspected to find out where each of the packages may be used . The package for the engine room may for instance in many cases be used all through a ferry.

GROUP 3: Forepeak

GROUP 4: Engine room.

INPUT : Uses the information generated by GROUP 1 regarding transverse frames and deck-beams.

Parallel contours - PCONs

OUTPUT: Contours in "wire-model"(see C.3). This concerns in particular parallel contours which constitute the inner boundery curves of the web-frames. These contours are used in production for actual "production parts," drawings of entire web-frames. If starting off in production, this last point is of course irrelevant.

GROUP 6: Web-fram.es in tankarea.

INPUT : Only the bcdy plan.
W this case information about
dimensions of framessis given in the
norms.

OUTPUT: As for GROUPS 3 & 4.

-Stringers:

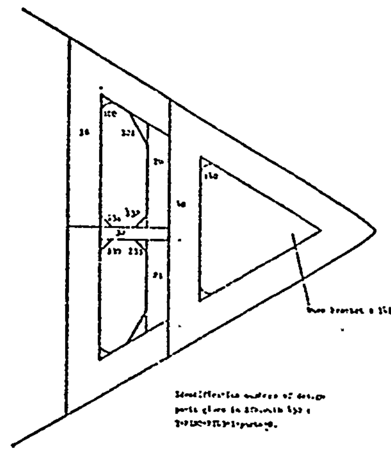
Two paclages are suppl ied.

GROUP 2: Stringers in forepeak

GROUP 12: Stringers in tank area.

INPUT : Information about stringers gencrated
hy GROUP 1 (GROUP 12! .
This regards both str.ingers on bulkhead::
and on the shell.

OUTPUT' : **Parallel]. contours (PCONS) " and drawings.**



d. Augmcilting contours.

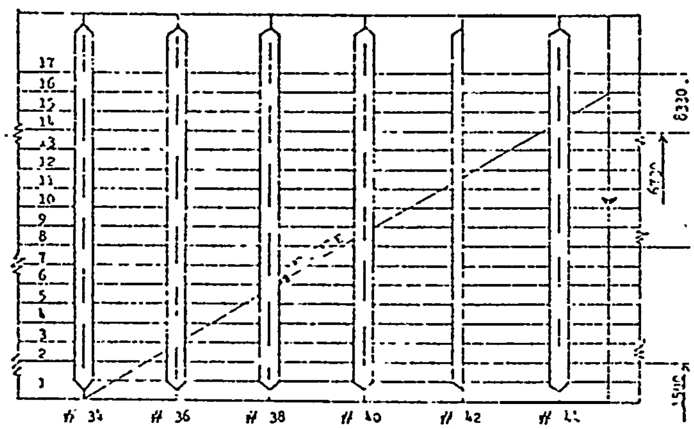
DETTAB

-The method is first tG produce tani;ari information regarding all the cutouts cn some contour . This information is stored ili 12W'aiJ! TA131c Matrices (DETTABN- *see c. 4.)* which have entries for positicn; type, parameters { a.n-cj J.cs Ctc . for each cutout along *a* contour. Note that the standard types of cutouts in GROUP 5 are referred to.

For the shell contours of transverse sections, this information is generated by LANSKI.

For the internal contours like transverse frames at deck or at longitudinal bulkheads, the information is generated by the norm package for "Generating DETTABMs", GROUP 7.

Input to this package is information about longitudinals previously generated by GROUP 1.



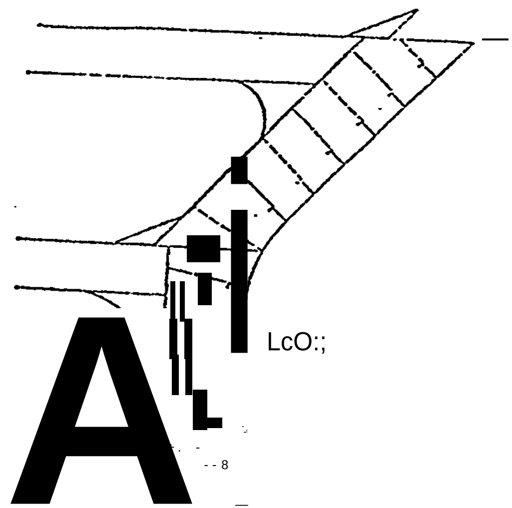
-The next step is simply to produce the actual contours using GENACON norms. These norms will fetch the standard cutouts from the norm library.

GENACON

-The norm GENACON 800 is available to produce augmented deck contours at shell directly on basis of the MIDEM of transverse frames in the X-Z projection (paragraph c)

e. Local stiffening.

One package, GROUP 14 is designated to deal with the problem of local stiffening at web-frames and brackets. For the former, an initial solution may be obtained automatically using the information about longitudinals.



See also the package concerned.
Note, however, that the main significance of i;his package .is obtained by introducing Standard Details (paragraph f.)

f. Divide/Standard Details

This box in the flowchart concerns obtaining the actual "production parts", i.e. single plates.

There are three main procedures involved, of which only one is described in a specific norm package (if using }..a Standard Details)
Note again that parts in the double bottom are treated slightly different and are dealt with in paragraph h.

1. Parts are generated by ALKON or specifically designated NORMS or REPs on basis of previously generated contours. A web-frame part for instance is generally limited by an ACON, a PCON and two seams consisting of straight lines.

In ships where many parts in the structure are of sirnular type this is a very efficient method . This procedure is more typical for parts on web-frames and stringcrs than for parts in large stiffened panels.

2. This methd consists of subdividing large, previcusl.y defined design parts. Norms are supplied for subdividing both parts (DIVIDE ncrms) and stiffening information.

DIVIDE
GENMIDEM 850

The design parts may have been generated by norms described in paragraph c where these can handle 7'iCONs (if needed) .

Note that this procedurc is under revision and that some norms are now available in GROUP 18 (Datastructure in production) which handle the transistion from Design to Production in a mere standardized and simpler ,fashiun (FINl1,2 - FJXl14j

3 . Smaller parts like brackets etc. may be generated.as Standard Details. BraCketS on web-frames (GROUP 14 - Local Stiffening) and brackets under decks along she].]. OK other longitudinal structure (GROUP 1) , have been previously defined in MIDEM format (paragraphs b and c).

Standard details, GROUP 19.

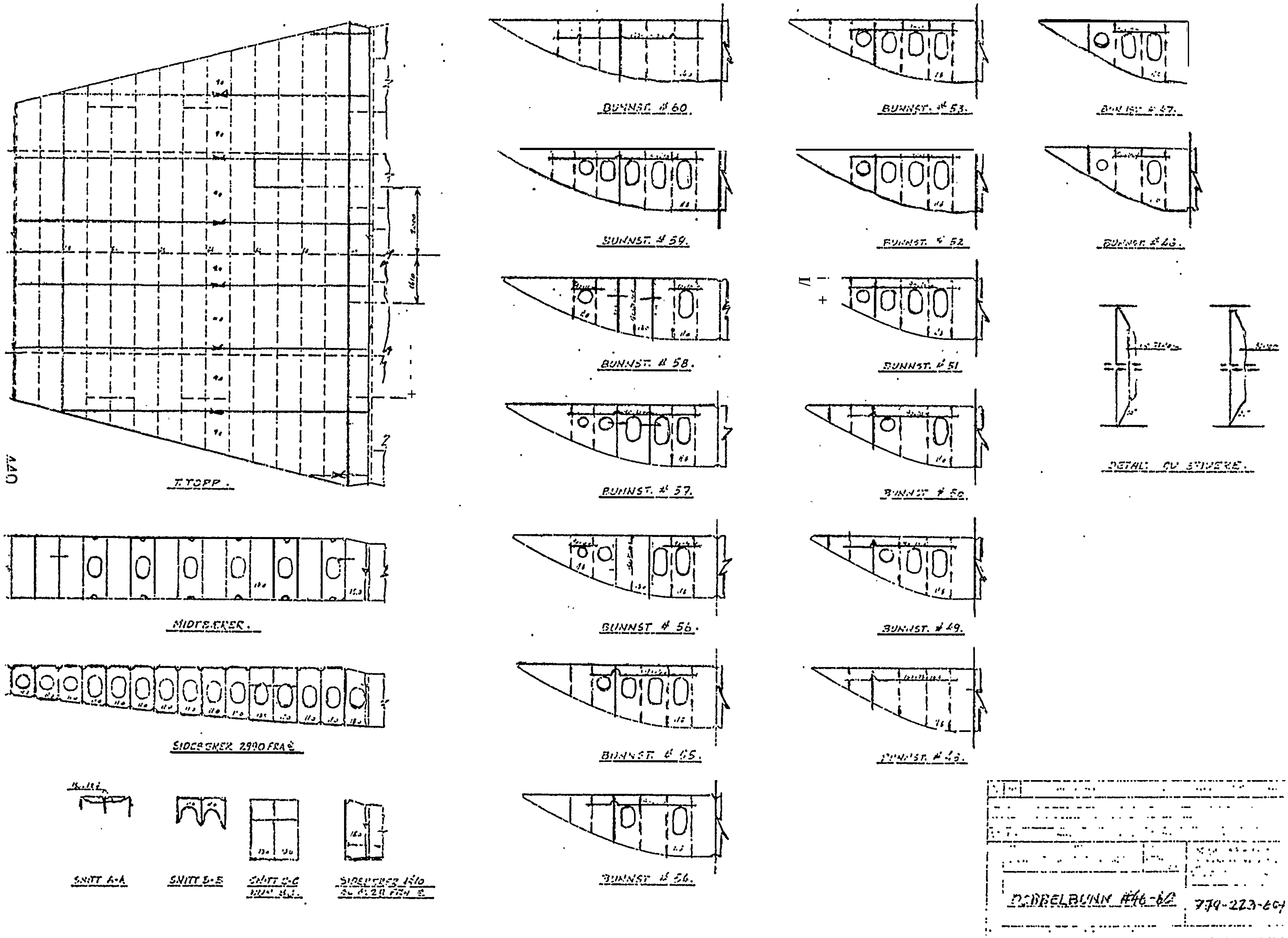
Using GROUP 19, information on type of detail may be entered in. the MIDEM which will then contain sufficient information for the part to be generatcd automatically.
. See also Book of Standard Details.

g. Double Bottcm in Design.

The task of definng the double bottom structure in design is taken care of by norm-- GROUP 11, to which may be referred. The main input to this package is defined. as in the tank-top plane (concerns girders, floors, holes etc..).
The package contains features for avoiding con-tradicting information.

The output consists of double bottom drawings of a standard which after adding text etc. is also suitable as "production drawings".

Illustrative "check and coordination" drawings may also be generated.



T.TOPP.
MIDTSEKER.
SIDESEKER 2990 FRA Ç
SNITT A-A
SNITT B-B
SNITT C-C
BUNNST. # 60.
BUNNST. # 59.
BUNNST. # 58.
BUNNST. # 57.
BUNNST. # 56.
BUNNST. # 55.
BUNNST. # 54.
BUNNST. # 53.
BUNNST. # 52
BUNNST. # 51
BUNNST. # 50.
BUNNST. # 49.
BUNNST. # 48.
BUNNST. # 47.
BUNNST. # 46.
DETALJ AV STIVERE.
DOBBELBUNN #46-60
779-223-604

440

h. Double Bottom in Production:

The detailed information available from the design package makes it possible to extract production parts semi-automatically. 'This is done by norm-GROUOP 16. Information to be added concerns margins for weld-shrinks.gc, notches and serial. number of each part.

i. Datastructure in Production.

This package (GROUP 18) contains the norms necessary to update and maintain the data-structure in production. The norms are important because the possible output hinges on this structure. The Users Guide for the package itself is necessary reference for a description of the structure.
See also chapter D.2.

Note that shell plates (from SHELL), longitudinal frames (from LFRAME) and transverse frames (see paragraph b) as well as all ALKON defined parts and stiffening are included.

Detailed material lists as well as weight and center of gravity calculations may be obtained for assemblies, subassemblies at any level (panels) or single parts.

Drawings may be obtained for entire assemblies or single planes within an assembly.

Note that the datastructure is important, though not essential for input to INTERACTIVE NEST

LISTING FOR:
ASSEMBLY 2365 -SUBASSEMBLY -LEVEL 1

HSFACE= MAJORSURFACE,-FIRST PART= RID2 AND LAST PART= RID3' R FRACTIONAL FRAMENO.

0CSIWPM2TSI

VIS	QUAL	DIMA	DIMB	DIMS	DIMT	DIMC	DIMU
20		220	42	11.0	.0		.0

POS	STYP	ETYP	LGHT MM	MASS KG	M S F A C E'		SIDE
6	1	1	5660	138	2	116.00	PORT

TOTAL LENGTH AND WEIGHT : 5660 MM 138 KG

VIS	QUAL	DIMA	DIMB	DIMS	DIMT	DIMC	DIMU
20		220	41	15.0	.0		.0

POS	STYP	ETYP	LGHT MM	MASS KG	M S F A C E'		SIDE
7	1	1	5660	129	2	116.00	PORT
8	1	1	5660	129	2	116.00	PORT
9	1	1	5650	129	2	116.00	PORT
10	1	1	5660	129	2	116.00	PORT

LISTING FOR:
ASSEMBLY 2385 -SUBASSEMBLY -LEVEL 1

LOCATION OF ORIGO: X-VALUE 60.000 M FROM AP Y-VALUE .000 M FROM CL Z-VALUE .000 M FROM BL

MSFACE=MAJORSURFACE: 1ST.PART=RID2 AND 2ND.PART=RID3 OR : FRACTIONAL FRAMENO.

DESIGNPARTS:

	POS/PART	AREA SQ.M	THICK MM	MASS KG	MOM.YZ' KPM	MOM.XZ KPM	MOM.XY KPM	LCG M	TCG M	VCG M	M S F A C E		SIDE
PLATE:	!	5.14	12.0	493.1	2934	1634	1770	5.97	3.25	3.55	1	39.00	PORT
PL.+STIFF.				606.3	3619	1968	2152	5.97	3.25	3.55			
PLATE:	i!	4.35	12.0	418.5	3285	1234	1515	7.87	2.89	3.59	1	40.00	PORT
PL.+STIFF.				525.4	4143	1522	1891	7.87	2.89	3.59			
PLATE:	3	3.93	12.0	377.7	3682	939	1451	9.77	2.42	3.78	1	41.00	PORT
PL.+STIFF.				480.2	4692	1162	1817	9.77	2.42	3.78			
PLATE:	Zb	.12	10.0	9.7	56	25	57	5.73	2.60	5.84	1	39.00	PORT
PLATE:	11	.14	10.0	11.0	17	49	37	1.55	4.40	3.40	1	39.00	PORT
PLATE:	12	.13	10.0	10.5	17	45	23	1.57	4.29	2.20	1	39.00	PORT
PLATE:	13	.22	10.0	17.8	8	75	24	.43	4.18	1.32	1	39.00	PORT
PLATE:	9	.07	10.0	5.7	44	15	35	7.69	2.62	6.05	1	40.00	PORT
PLATE:	lb	.12	10.0	9.6	47	37	33	4.85	3.84	3.40	1	40.00	PORT
PLATE:	15	.12	10.0	9.6	20	43	21	2.05	4.42	2.20	1	40.00	PORT
PLATE:	10	.05	10.0	6.6	63	13	40	9.61	1.95	6.09	1	41.00	PORT
PLATE:	17	.11	10.0	8.9	74	28	46	6.31	3.12	5.20	1	41.00	PORT
PLATE:	19'	.11	10.0	8.9	74	27	30	6.25	2.99	3.40	1	41.00	PORT
PLATE:	16	.09	10.0	7.5	38	20	13	5.03	3.76	1.76	1	41.00	PORT
PLATE TOTAL:		14.75		1399.1	10357	4156	5094	7.40	3.00	3.65			
PL.+STIFF.TOTAL:				1718.6	12999	5035	6219	7.57	2.93	3.62			

TOTAL WEIGHT OF THE ABOVE ASSEMBLY: 1.72 TONS

TOTAL CENTRE OF GRAVITY IN RELATION TO CHOSEN ORIGO IS X-VALUE 7.57 M Y-VALUE 2.93 M Z-VALUE 3.62 M

j. output fuinctions:

The general norms involved in this are contained in two packages, GROUP 5 for drawings and GROUP 20 for list output.

Note that in some cases there are also output-functions contained as part of other packages if the norms are special to this group only.

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MELT,L  KEYWORDREFC
ELT007 RL70-1 05/08-11:37:05-(0,)

   MAIN ENTRY  SUB ENTRY          REFERENCE        COMMENTS


   LONGITUDINAL FRAMES AT SHELL

               ANGLE CALCULATIONS  ANGLE2           ANGLE FOR CALC. OF CUTO HEIGHT
                                   ANGLE4           ANGLE RELATED TO BRACKETS ON LONG.
                                   ANGLE5           MOUNTING ANGLE FOR BRACKET
                                   ANGLE6           ANGLE RELATED TO BRACKETS ON LONG.

               CONTOURS,AUGMENTED  MAIN ENTRY

               CONTOURS,GENERAL    GENCON100        LONGITUDINAL CONTOUR IN PROJECTION
                                                    OF LONGITUDINAL

               CUTOUTS             MAIN ENTRY


   LONGITUDINALS,INTERNAL STRUCTURE

               DEFINITION m        GROUP1 ETC.
                                   GENMIDEM0        GENERAL
                                   GENMIDEM3        FOR TANKTOP
                                   GENMIDEM811      GENERAL - ENTRY FOR ENDINDICATORS
                                   GENMIDEM2        ENDING LONGITUDINALS AT SHELL/AFT
                                   GENMIDEM10       ENDING LONGITUDINALS AT SHELL/FORE
                                   GENMIDEM480      ENDING LONGITUDINALS AT LONGITUDINAL
                                                    BULKHEAD
                                   GENMIDEM850      DIVIDE LONG. OR REMOVE PARTS FOR
                                                    HATCHES

               CONTGURS*AUGMENTED  SEE ALSO GROUP7
                                   GENACON10        CONTOURS AT DECKS
                                   GENACON20        CONTOURS AT LONG. BULKHEADS

               CUTOUT TABLES       GROUP7
                                   GENCUTTAB0       TABLE OF CUTOUTS RELATED TO MIDEM

               DETAIL TABLES       GROUP7
                                   GENTAB100        INTERMEDIATE DETTAB
                                   GENTAB101        SORTS AND MERGES INTERMEDIATE DETTAB
                                   GENTAB102        DETAIL TABLES AT DECK SEE GENTAB105
                                   GENTAB103        DETAIL TABLES AT LBULK SEE GENTAB105
                                   GENTAB103        DETAIL TABLES AT LBULK SEE GENTAB105
                                   GENTAB104        SORTS AND MERGES INTERMEDIATE DETTAB
                                   GENTAB105        GENERATES TABLE OF DETAILS FOR
                                                    DECKS OR LBULKS

               CUTOUTS             MAIN ENTRY


   PARALLELL CONTOURS

               GENERAL             GENPAR1          PARALLES TO LOFTING CONTOURS
                                   GENPAR850        MODIFICATION FOR BRACKET SHAPE
                                   GENPAR808/889    STRAIGHT LINE APPROXIMATIONS

               FOREPEAK            GROUP3
                                   GENPAR461        TRANSVERSE FRAME AT SHELL
                                   GENPAR461        TRANSVERSE FRAME AT DECKS
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SELT,L ALPHABETIC/GROUP,ALPHABETIC/GROUP.
LJT607 RL70-1 05/07-18:45:30-(0,0)
000001  NEW 000                        * ALPHABETIC LIST OF PACKAGE NORMS *
000002  NEW 000
000003  NEW 000    NORM NAME  1     PURPOSE          1  INPUT  1 OUTPUT  1  TIME      REMARKS
000004  NEW 000               1                      1         1         1
000005  -01 000    BKT100     1BRACKET. STRAIGHT     1IN CALL  1TO BUFFER1
000006      000               1ARMS, HYPOTHENUSE IS1           1         1
000007      000               1CIRCLE SHAPED         1         1         1
000008      000               1                      1         1         1
000009      000    BKT101     1BRACKET. STRAIGHT     1IN CALL  1TO BUFFER1
000010      000               1ARMS, HYPOTHENUSE IS1           1         1
000011      000               1STRAIGHT WITH TOES    1         1         1
000012      000               1                      1         1         1
000013      000    BKT103     1BRACKET, STRAIGHT     1IN CALL  1TO BUFFER1
000014      000               1ARMS, HYPOTHENUSE     1         1         1            1
000015      000               1WITH FLANGE           1         1         1            1
000016      000               1                      1         1         1            1
000017      000    BKT104     1BRACKET, STRAIGHT     1IN CALL  1TO BUFFER1            1VARIABLE TOES
000018      000               1ARMS, HYPOTHENUSE IS1           1         1            1
000019      000               1CIRCLE SHAPED         1         1         1            1
000020      000               1                      1         1         1            1
000021      000    BKT107     1STRAIGHT ARMS         1IN CALL  1TO BUFFER1            1VARIABLE TOES
000022      000               1                      1         1         1            1AND NOTCHES
000023      000               1                      1         1         1            1DETAIL O
000024      000               1                      1         1         1            1
000025      000    BKT109     1STRAIGHT ARMS         1IN CALL  1TO BUFFER1            1DETAIL K
000026      000               1                      1         1         1            1
000027      000    BKT110     1ONE ARM ALONG         1IN       1TO BUFFER1            1ORIENTATION
000028      000               1CONTOUR               1CALL     1         1            1MAY BE GIVEN
000029      000               1                      1         1         1            1
000030      000    BKT111     1STRAIGHT ARMS         1IN CALL  1TO SBUF  1            1
000031      000               1STIFFENER DECIDES     1         1         1            1
000032      000               1LENGTH OF ARMS        1         1         1            1
000033      000               1                      1         1         1            1
000034      000    BKT209     1STRAIGHT ARMS         1IN CALL  1TO BUFFER1            1APPROX DETAIL
000035      000               1FLANGE                1         1         1            1K
000036      000               1                      1         1         1            1
000037      000    BKT210     1ONE ARM ALONG         1IN CALL  1TO BUFFER1            1APPROX DETAIL
000038      000               1CONTOUR               1         1         1            1M
000039      000               1                      1         1         1            1
000040      000    BKT220     1ONE ARM ALONG         1PCON,    1         1            1APPROX DETAIL
000041      000               1LONGITUDINAL FRAME    1LTAB     1         1            1K
000042      000               1                      1         1         1            1
000043      000    BKT221     1ONE ARM ALONG         1LTAB     1         1            1APPROX DETAIL
000044      000               1LONGITUDINAL          1         1         1            1K
000045      000               1                      1         1         1            1
000046      000    BKT309     1STRAIGHT ARMS         1         1         1            1APPROX DETAIL
000047      000               1                      1         1         1            1L
000048      000               1                      1         1         1            1
000049      000    BKT310     1ONE ARM ALONG         1IN CALL  1TO BUFFER1            1DETAIL T
000050      000               1CONTOUR               1         1         1            1
000051      000               1                      1         1         1            1
000052      000    BKT311     1BRACKET BETWEEN DECK1LCON AT    1TO BUFFER1            1
000053      000               1AND SHELL             1SHELL    1         1            1

END ELT.
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